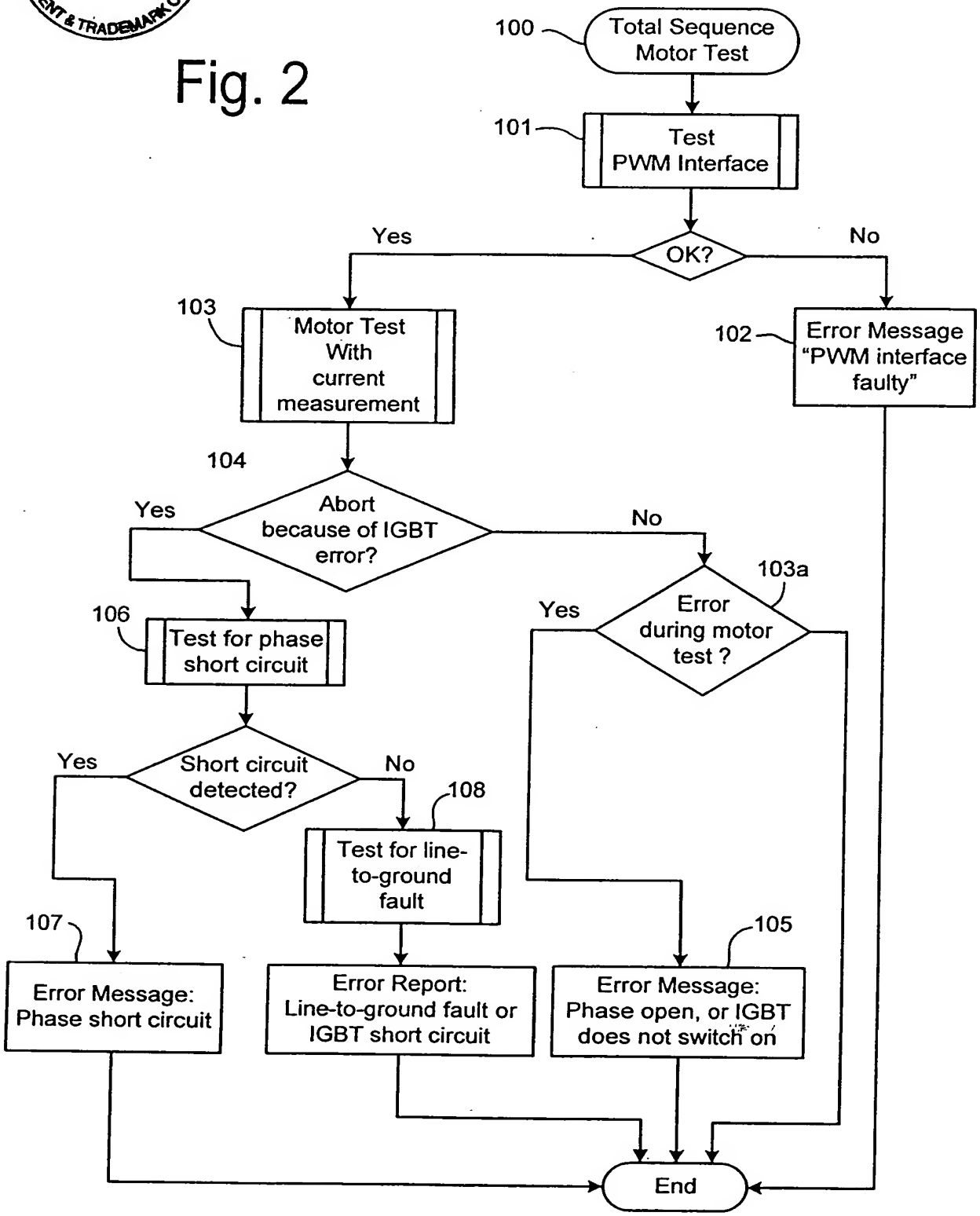
Fig. 2



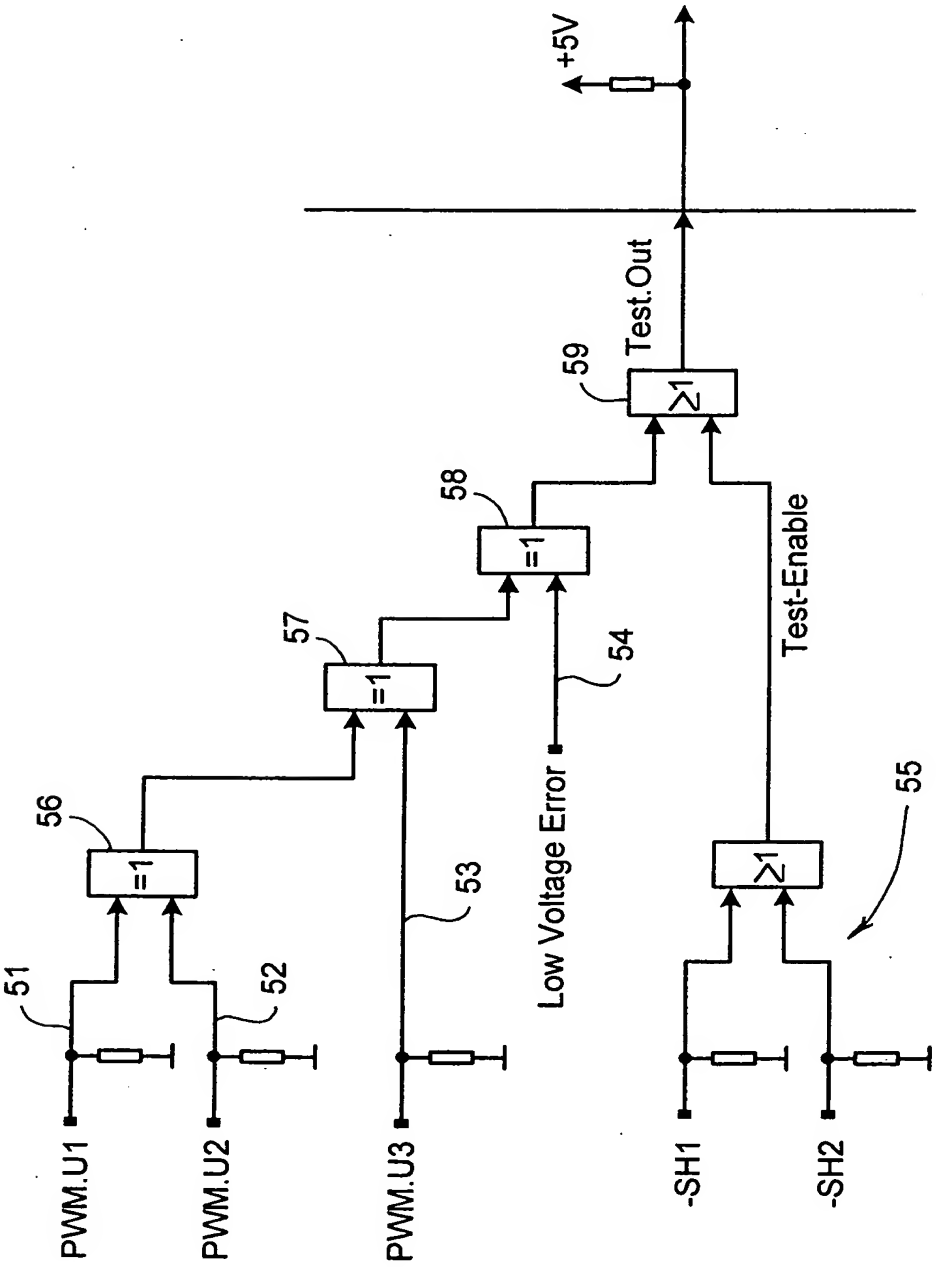

+5V
Test.Out
59
≥1
58
=1
57
=1
56
=1
Test-Enable
54
Low Voltage Error
53
55
≥1
51
52
PWM.U1
PWM.U2
PWM.U3
-SH1
-SH2

Fig. 3

Fig. 4

PWM - Signals
PWM1: 0 1 0 0 1 0 1 1
PWM2: 0 0 1 0 1 1 0 1
PWM3: 0 0 0 1 1 1 1 0

Test. Out:

Low Voltages OK

1, 0, 0, 0, 0, 1, 1, 1 // all OK

1, 1, 0, 0, 1, 1, 0, 0 // PWM.U1 Stuck on 0
1, 0, 1, 0, 1, 0, 1, 0 // PWM.U2 Stuck on 0
1, 0, 0, 1, 1, 0, 0, 1 // PWM.U3 Stuck on 0

1, 1, 1, 0, 0, 0, 0, 1 // PWM.U1 = PWM.U2
1, 0, 1, 1, 0, 1, 0, 0 // PWM.U2 = PWM.U3
1, 1, 0, 1, 0, 0, 1, 0 // PWM.U1 = PWM.U3
1, 0, 0, 0, 0, 0, 0, 0 // PWM.U1 = PWM.U2 = PWM.U3

Low Voltages Faulty

0, 1, 1, 1, 1, 0, 0, 0 // PWM Signals OK

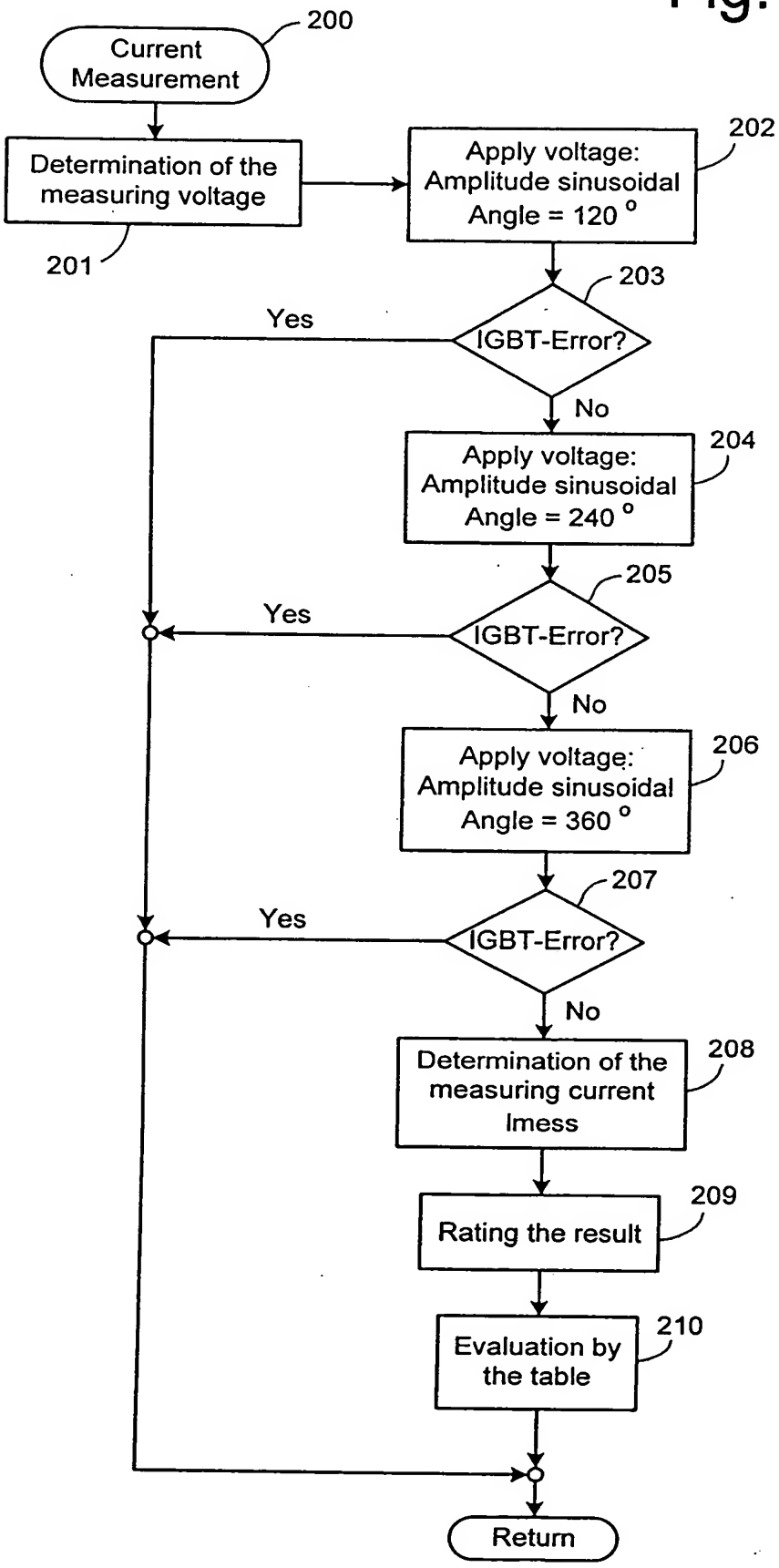
0, 0, 1, 1, 0, 0, 1, 1 // PWM.U1 Stuck on 0 + low voltage
0, 1, 0, 1, 0, 1, 0, 1 // PWM.U2 Stuck on 0 + low voltage
0, 1, 1, 0, 0, 1, 1, 0 // PWM.U3 Stuck on 0 + low voltage

0, 0, 0, 1, 1, 1, 1, 0 // PWM.U1 = PWM.U2 + low voltage
0, 1, 0, 0, 1, 0, 1, 1 // PWM.U2 = PWM.U3 + low voltage
0, 0, 1, 0, 1, 1, 0, 1 // PWM.U1 = PWM.U3 + low voltage
0, 1, 1, 1, 1, 1, 1, 1 // PWM.U1 = PWM.U2 = PWM.U3 + low voltage

General errors

0, 0, 0, 0, 0, 0, 0, 0 // SH1 or SH2 not "0"
1, 1, 1, 1, 1, 1, 1, 1 // Test – output open

Fig. 5


200
Current Measurement
Determination of the measuring voltage
201
202
Apply voltage: Amplitude sinusoidal Angle = 120 °
203
IGBT-Error?
Yes
No
204
Apply voltage: Amplitude sinusoidal Angle = 240 °
205
IGBT-Error?
Yes
No
206
Apply voltage: Amplitude sinusoidal Angle = 360 °
207
IGBT-Error?
Yes
No
208
Determination of the measuring current Imess
209
Rating the result
210
Evaluation by the table
Return

	Measurement Step 1	Measurement Step 2	Measurement Step 3	Result
U1	U	-U/2	-U/2	
U2	-U/2	U	-U/2	
U3	-U/2	-U/2	U	
-ERR	1	1	1	No short circuit
	0	0	1	No short circuit Phase 11-12
	0	1	0	No short circuit Phase 11-13
	1	0	0	No short circuit Phase 12-13
	0	0	0	Perform test for Line-to-ground fault

Fig. 17

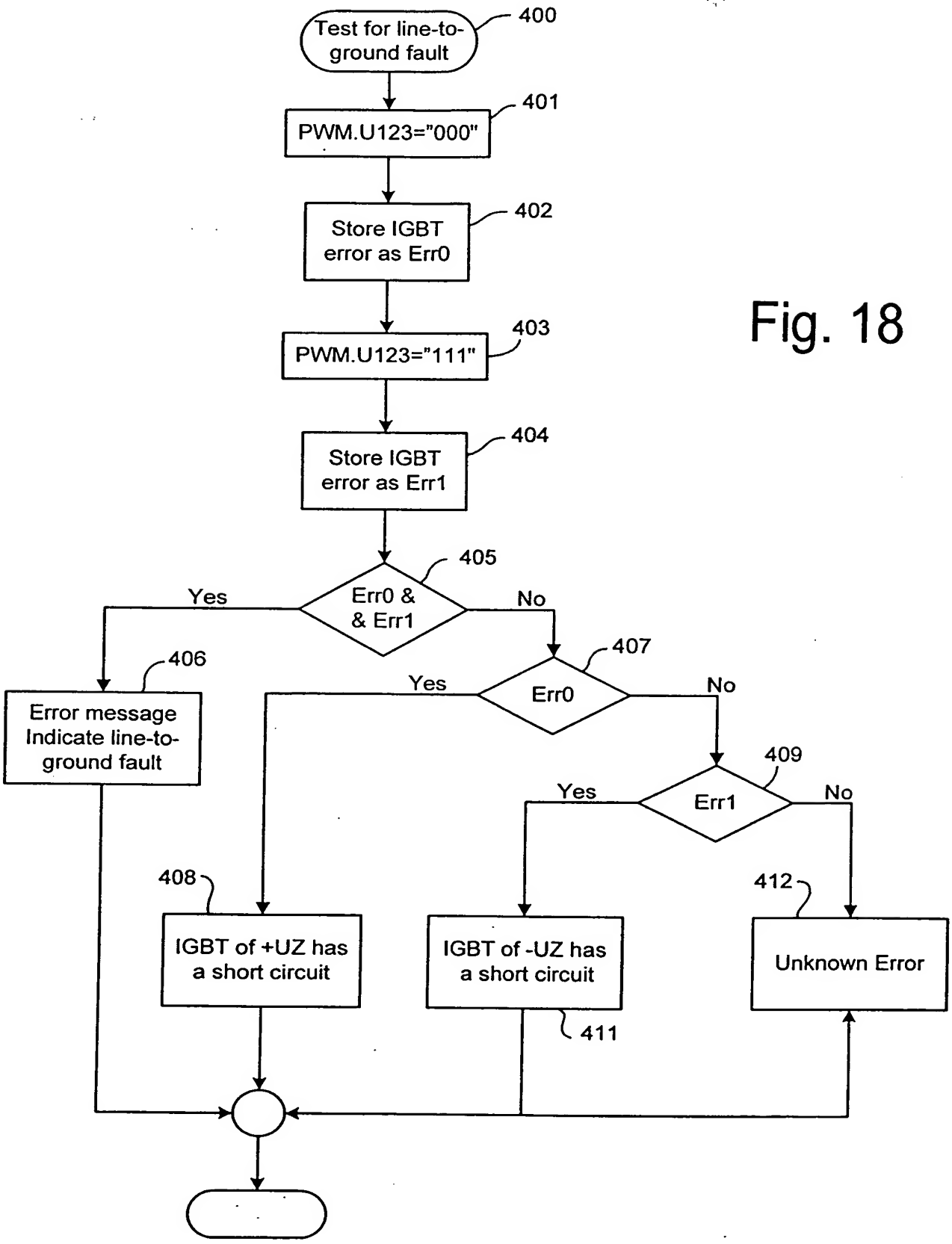

Test for line-to-ground fault
400
PWM.U123="000"
401
Store IGBT error as Err0
402
PWM.U123="111"
403
Store IGBT error as Err1
404
Err0 & & Err1
405
Yes
No
Error message Indicate line-to-ground fault
406
Err0
407
Yes
No
Err1
409
Yes
No
IGBT of +UZ has a short circuit
408
IGBT of -UZ has a short circuit
411
Unknown Error
412

Fig. 18